MPP meeting 23 March 2012

Original agenda:

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- Load on Q6 in case of injection failure and primary beam impacting on the TCLIB
(A.Christov)
- Cryogenic system measurements during quench test MDs (dispersion suppressor,
bump) and luminosity production in 2010 and 2011 (K. Brodzinski)
- AOB
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Present:

A. Christon (EN/STI), A. Priebe (BE/BI), J. Wenninger (BE/OP), R. Jacobsson (PH/LHCB), C. Bracco (TE/ABT), M. Zerlauth (TE/MPE), T. Baer (BE/OP), A. Lechner (EN/STI), A. Apollonio (TE/MPE), F. Cerutti (EN/STI), V. Vlachoudis (EN/STI), B. Dehning (BE/BI), R. Schmidt (TE/MPE) and J. Blanco Sancho (TE/MPE).

Minutes:

Velo Interlock (R. Jacobsson)

Richard presented an issued on the VELO logic that concerns the interlock of the VELO. The issue was discovered 9-March-2012 and has been in the logic for ~2years.

The problem is that it was not possible to read the resolvers of the stepper motors while moving. When then VELO is being moved the PLC is continuously sending information to the stepper motors thus impeding the readout of the resolvers. This is due to a bandwidth limitation. Richard commented that a more powerful PLC could have allowed sending and reading at the same time but this is the way it has been done.

Richard presented the user_permit logic implemented up to now and the proposed solution to the problem. The idea is to force that when the VELO is moving the MDA flag must be true.

Markus proposed to test the modification in the lab but Richard replied that as there are access conditions at the moment it can be tested locally.

First Results – Beam Energy deposition into superfluid Helium (K. Brodzinski)

Krzysztof presented the first results of the calculations of beam energy deposition into superfluid helium (SFHe).

The idea behind these studies is obtain the critical temperature of the superconducting coils by calculating the energy deposition on the superfluid helium bath. The energy deposition is calculated using the pressure and temperature changes of the SFHe. The sensitivity is ~1-2kJ.

The data used comes from a bunch test done on 6-10-2010 and the quench testat LEIR on the 6-12-2011.

The deposited energy per magnet is difficult to be calculated. The thermometers are not placed close to the coil therefore there is a time delay due to the heat transfer into the SFHe. This delay is in the order of ~39seconds. During this time the heat propagates longitudinally along the half cell. So a magnet is affected by its neighbors. This large time (~39seconds) is due to the thermal resistance of SFHe. Its thermal conductivity is not fixed and depends on the heat load. The more heat load the less thermal conductivity.

On the LEIR test, the thermometers are directly placed on the coil. Due to this the temperature measure is more sensitive. This is the reason why the temperature vs time plot presents those peaks.

In order to calculate the energy deposition one has to consider a certain volume of SFHe. When using all the SFHe helium is considered strange results are obtained. Ruediger pointed out that in the LHC a lot of energy is deposited outside of the region with SFHe. An LHC standard magnet has more mass than the one considered on this experiments.

The BLM signal of RS09 (5secs) is in very good agreement with the Energy deposition per magnet along the cell. In order to have a good fit, one has to avoid the longitudinal heat propagation.

In order to correctly obtain the temperature of the coils in the LHC magnets it is required to get a precise model that describes the heat transfer from A->B (from the coil to the thermometer). Then one can correlate it with the BLM signal and then obtain a threshold for the BLMs.

Krzysztof commented that although there is only one pressure sensor per half cell, the pressure equilibrates with speed of sound. The pressure variation seen was around ΔP= 0.01 bar that is sufficient to calculate the energy deposition.

Mariusz asked if it is possible to know the energy deposition per magnet. Krzysztof answered that it is possible but it is difficult to quantify the effect of other magnets. Bernd asked if the heat propagation time response was simulated before with the stinger. Krzysztof said that it wasn't done on stinger but that the longitudinal time propagation is in timber.

Ruediger commented that during collisions the losses on the DS increases by a factor ~10 so it might be possible to see them. Krzysztof pointed out that as they are continuous losses it might be required to close the valves from the heat exchanges and that the analysis would be complicated.

Mariusz asked if it is foreseen a quench test with protons. Krzysztof answered that his first priority is the cryo maintain.

Krzysztof demanded that for the next MDs the zones are defined in advance so he can check that all the thermometers are in place.

Load on Q6 in case of injection failure and primary beam impacting on the TCLIB (A. Christov)

Asen presented a FLUKA study of an injection failure with the primary beam impacting on the TCLIB. On the 18^{th} April 2011, 36 bunches were swept by the kicker into the TDI & TCLIB. This caused 11 magnets downstream to quench.

Ruediger asked why the energy deposition on the MQM is all horizontal. Asen answered that the upper jaw is shielded by another collimator and that what is seen on the MQM is what escapes from the gap.

The TCLA is only used at injection and then it is completely retracted.

The energy deposition on the MQML is dominated by the magnetic field of the previous magnet.

The highest energy deposition is located on the MQM.A7L8. From the last element of Q7 and downstream there is lack of statistics.

Simulations are done for 3.5TeV and not for 450 GeV. The simulations must be redone for 450 GeV. Also some optimizations need to be implemented downstream in order to improve the statistics. Simulations must cover the operational position of the TCLAB jaws